



General

Guideline Title

Management of chronic kidney disease.

Bibliographic Source(s)

University of Michigan Health System. Management of chronic kidney disease. Ann Arbor (MI): University of Michigan Health System (UMHS); 2014 Mar. 25 p. [26 references]

Guideline Status

This is the current release of the guideline.

Recommendations

Major Recommendations

Note from the University of Michigan Health System (UMHS) and the National Guideline Clearinghouse (NGC): The following guidance was current as of 2014. Because UMHS occasionally releases minor revisions to its guidance based on new information, users may wish to consult the [original guideline document](#) for the most current version.

Note from NGC: The following key points summarize the content of the guideline. Refer to the full text of the original guideline document for detailed information on each of the screening procedures.

The strength of recommendation (I-III) and levels of evidence (A-D) are defined at the end of the "Major Recommendations" field.

Background

Despite increasing prevalence of chronic kidney disease (CKD), it is often under-recognized and under-treated. [A]

Evidence for screening and management of early stage CKD is limited due to absence of large randomized controlled trials.

Definition and Staging (see Table 1 and Table 2 in the original guideline document)

Kidney damage for ≥ 3 months, defined by structural or functional abnormalities of the kidney, with or without decreased glomerular filtration rate (GFR)

Diagnosis

- Screen patients with diabetes annually for microalbuminuria if not on an angiotensin converting enzyme inhibitor (ACEI) or angiotensin receptor blocker (ARB) and for creatinine and estimated GFR [IA]. Consider screening for CKD among patients at increased risk,

especially those with hypertension [IA] and patients aged >55 years. [IID]

- Laboratory studies needed to diagnose and stage CKD include an assessment of GFR (usually estimated by the Modification in Diet and Renal Disease Study [MDRD] equation) and urine studies for the presence or absence of albuminuria. [IC]
- Ultrasound imaging for structural kidney disease may also be helpful in certain populations. [IID]

Treatment

- Blockade of the renin angiotensin aldosterone system with either an ACEI or an ARB is the cornerstone of treatment to prevent or decrease the rate of progression to end stage renal disease. [IA]
- Blood pressure control (<140/90) reduces renal disease progression and cardiovascular morbidity and mortality. Current evidence does not support stricter blood pressure control targets for the majority of patients with CKD [IA]. CKD patients with albuminuria may benefit from tighter control with a target of <130/80 [IIA].
- Optimally manage comorbid diabetes and address cardiovascular risk factors to decrease risk for cardiovascular disease – the leading cause of mortality for patients with CKD. [IA] Statin or statin/ezetimibe therapy is recommended in all CKD patients age ≥ 50 years to decrease the risk of cardiovascular or atherosclerotic events. [IA]
- Monitor for other common complications of CKD including: anemia, electrolyte abnormalities, abnormal fluid balance, mineral bone disease, and malnutrition. [ID]
- Avoid nephrotoxic medications to prevent worsening renal function. [ID]

Monitoring and Follow Up

- The timing and frequency of CKD monitoring and follow up depends on disease severity and risk for progression; GFR and albuminuria should be assessed a minimum of once per year. [ID] (see Table 16 in the original guideline document)
- Refer CKD stage G4 or G5 (see Table 2 in the original guideline document) to nephrology for co-management and preparation for renal replacement therapy. Consider referral at earlier stage to assist with diagnosis of underlying cause and/or treatment of common complications of CKD. [IC]

Definitions:

Levels of Evidence

- A. Randomized controlled trials
- B. Controlled trials, no randomization
- C. Observational trials
- D. Opinion of expert panel

Strength of Recommendation

- I. Generally should be performed
- II. May be reasonable to perform
- III. Generally should not be performed

Clinical Algorithm(s)

None provided

Scope

Disease/Condition(s)

Chronic kidney disease (CKD)

Note: CKD is kidney damage for ≥ 3 months, defined by structural or functional abnormalities of the kidney, with or without decreased glomerular filtration rate (GFR)

Guideline Category

Diagnosis

Management

Screening

Treatment

Clinical Specialty

Cardiology

Internal Medicine

Nephrology

Preventive Medicine

Intended Users

Advanced Practice Nurses

Nurses

Physician Assistants

Physicians

Guideline Objective(s)

- To identify populations that may benefit from more systematic screening for chronic kidney disease (CKD) and provide an overview of methods for screening and diagnosis
- To outline treatment options for patients with CKD to decrease progression of renal deterioration and potentially decrease morbidity and mortality
- To highlight common co-morbid conditions such as cardiovascular disease (CVD) and diabetes, emphasizing the importance of aggressive management of these conditions to potentially decrease morbidity and mortality among patients with CKD

Target Population

Adults with chronic kidney disease (CKD)

Interventions and Practices Considered

Diagnosis

Screening for microalbuminuria (patients with diabetes)

Screening for chronic kidney disease (CKD) (patients with increased risks)

Laboratory studies

- Glomerular filtration rate (GFR)
- Urine studies for albuminuria

Ultrasound imaging

Treatment

1. Angiotensin converting enzyme inhibitor (ACEI) or an angiotensin receptor blocker (ARB)
2. Blood pressure control
3. Management of comorbid diabetes and consideration of cardiovascular risk factors
4. Monitoring for CKD complications (anemia, electrolyte abnormalities, abnormal fluid balance, mineral bone disease, and malnutrition)
5. Avoidance of nephrotoxic medications
6. Follow-up
 - Yearly assessment of GFR and albuminuria
 - Referral to nephrology (if indicated)

Major Outcomes Considered

- Kidney damage
- Disease progression
- End stage renal disease (ESRD)
- Cardiovascular disease (CVD)
- Morbidity and mortality

Methodology

Methods Used to Collect/Select the Evidence

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

Strategy for Literature Search

The team began the search of literature by accepting the results of the literature searches performed for fairly recent systematic reviews:

- Black C, Sharma P, Scotland G, McCullough K, McGurn D, Robertson L, et al. Early referral strategies for management of people with markers of renal disease: a systematic review of the evidence of clinical effectiveness, cost-effectiveness and economic analysis. [MEDLINE search through Jan 2009.]
- Kidney Disease: Improving Global Outcomes (KDIGO) CKD-MBD Work Group. KDIGO clinical practice guideline for the diagnosis, evaluation, prevention, and treatment of chronic kidney disease-mineral and bone disorder (CKD-MBD). [full search through Dec 2007, randomized controlled trials (RCTs) through Nov 2008]
- VA/DoD clinical practice guideline for management of chronic kidney disease in primary care [search through Dec. 2006]
- K/DOQI clinical practice guidelines for chronic kidney disease: evaluation, classification, and stratification. Kidney Disease Outcome Quality Initiative. [search through June 2000]

To update those searches with more recent literature and to examine literature on other topics, a systematic search of literature on MEDLINE was performed.

The major search terms were: "chronic kidney disease excluding end stage renal disease"; time frame started with 1/1/07 unless a more recent review (above) addressed the topic; type of publication was guidelines, controlled trials (including meta-analyses), and cohort studies; population was human/adult; and language was English.

Within these parameters individual searches were performed for the following topics: screening; assessment of renal function/staging; history and symptoms; physical exam; laboratory tests; imaging; renin-angiotensin system blockade (ACEI, ARB, optimizing blood pressure, reducing albuminuria, inhibition of renal fibrosis); treatment of diabetes mellitus and of hypertension; management of dyslipidemia, smoking, and aspirin therapy; management of anemia, mineral bone disease, metabolic acidosis, potassium and sodium balance, fluid balance/volume management, and malnutrition; dietary recommendations (sodium, protein, malnutrition), medication dose adjustment/medications to avoid/nephrotoxic medications; psychiatric disorders (depression); sleep quality and sleep disorders; sexual dysfunction, monitoring and follow-up; pregnancy, geriatrics, minorities, and other results for the major search terms not included in the above specific searches. The specific search strategy is available upon

request.

The search was conducted in components each keyed to a specific causal link in a formal problem structure, which is available upon request. The search was supplemented with very recent clinical trials known to expert members of the panel. Negative trials were specifically sought. The search was a single cycle.

Number of Source Documents

Not stated

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Levels of Evidence

- A. Randomized controlled trials
- B. Controlled trials, no randomization
- C. Observational trials
- D. Opinion of expert panel

Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review

Description of the Methods Used to Analyze the Evidence

Not stated

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

Conclusions were based on prospective randomized clinical trials if available, to the exclusion of other data; if randomized controlled trials were not available, observational studies were admitted to consideration. If no such data were available for a given link in the problem formulation, expert opinion was used to estimate effect size.

Rating Scheme for the Strength of the Recommendations

Strength of Recommendation

- I. Generally should be performed
- II. May be reasonable to perform
- III. Generally should not be performed

Cost Analysis

- A recent cost-effectiveness analysis concluded that annual urine dipstick testing for albuminuria in patients with diabetes or hypertension, as well as those aged 55 years and older without concurrent diabetes or hypertension, was cost-effective.
- A recent Kidney Disease: Improving Global Outcomes (KDIGO) guideline suggests statin + ezetimibe as an alternative to statin monotherapy, especially in patients with an estimated glomerular filtration rate (eGFR) ≤ 60 ml/min/1.73 m² (e.g., g3a-5). In clinical practice, this approach may be limited by the higher cost of ezetimibe compared with statin monotherapy.

Method of Guideline Validation

Internal Peer Review

Description of Method of Guideline Validation

Drafts of this guideline were reviewed in clinical conferences and by distribution for comment within departments and divisions of the University of Michigan Medical School to which the content is most relevant: Family Medicine, General Medicine, and Nephrology. The final version was endorsed by the Clinical Practice Committee of the University of Michigan Faculty Group Practice and the Executive Committee for Clinical Affairs of the University of Michigan Hospitals and Health Centers.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

Conclusions were based on prospective randomized clinical trials (RCTs) if available, to the exclusion of other data. If RCTs were not available, observational studies were admitted to consideration. If no such data were available for a given link in the problem formulation, expert opinion was used to estimate effect size.

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Appropriate management of chronic kidney disease (CKD) to delay and prevent life-threatening adverse outcomes

Potential Harms

- Many herbs can potentially interact with prescription medications or cause additional kidney damage in patients with underlying chronic kidney disease (CKD).
- In certain CKD populations, including the elderly and those with diabetes mellitus, aggressive blood pressure control could lead to negative outcomes such as acute deterioration in kidney function, increased risk for cardiovascular events and orthostatic hypotension.

See Table 7 in the original guideline document for adverse effects associated with common agents for renin angiotensin aldosterone blockade used in treatment for CKD.

Statins

- Recent studies have provided conflicting evidence regarding the benefit of statins among patients with end stage renal disease (ESRD) receiving renal replacement therapy. Some of the studies have demonstrated an increased risk of cerebrovascular events among dialysis patients taking statins.

- The use of standard doses of statins appears safe among most patients with CKD and does not require special monitoring beyond that for non-CKD patients. More intensive statin regimens have not been well studied in patients with CKD and there is concern that this population is at higher risk for adverse events related to the medication.
- For patients with CKD G1-G2, the only exception to statin drugs used in the general population is that 40 mg of rosuvastatin daily is not recommended because of potential increased risk for adverse renal event.

Contraindications

Contraindications

- Eplerenone (Inspira) is contraindicated in patients with serum creatinine (SCr) ≥ 2 mg/dL (males) or ≥ 1.8 (females) due to increased risk of hyperkalemia.
- Clinicians should be aware that angiotensin converting enzyme inhibitors (ACEIs) and angiotensin receptor blockers (ARBs) are contraindicated in pregnancy (category X, known to cause birth defects).

Qualifying Statements

Qualifying Statements

These guidelines should not be construed as including all proper methods of care or excluding other acceptable methods of care reasonably directed to obtaining the same results. The ultimate judgment regarding any specific clinical procedure or treatment must be made by the physician in light of the circumstances presented by the patient.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Implementation Tools

Patient Resources

Staff Training/Competency Material

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

Living with Illness

Staying Healthy

IOM Domain

Effectiveness

Patient-centeredness

Identifying Information and Availability

Bibliographic Source(s)

University of Michigan Health System. Management of chronic kidney disease. Ann Arbor (MI): University of Michigan Health System (UMHS); 2014 Mar. 25 p. [26 references]

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2014 Mar

Guideline Developer(s)

University of Michigan Health System - Academic Institution

Source(s) of Funding

University of Michigan Health System

Guideline Committee

Chronic Kidney Disease Guideline Team

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Financial Disclosures/Conflicts of Interest

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Guideline Status

This is the current release of the guideline.

Guideline Availability

Electronic copies: Available from the [University of Michigan Health System Web site](#) .

Availability of Companion Documents

Continuing Medical Education (CME) information is available from the [University of Michigan Health System Web site](#) .

Patient Resources

The following are available:

- Chronic kidney disease: what does it mean for me? Ann Arbor (MI): University of Michigan Health System; 2014 Feb. 7 p. Electronic copies: Available in Portable Document Format (PDF) from the [University of Michigan Health System \(UMHS\) Web site](#) .
- Eating right for kidney health: tips for people with chronic kidney disease. Ann Arbor (MI): University of Michigan Health System; 2014 Feb. 6 p. Electronic copies: Available in PDF from the [UMHS Web site](#) .
- Taking care of your kidneys: how to keep your kidneys as healthy as possible after a diagnosis of CKD (chronic kidney disease). Ann Arbor (MI): University of Michigan Health System; 2014 Feb. 3 p. Electronic copies: Available in PDF from the [UMHS Web site](#) .
- My I-SMART: action plan for chronic conditions. Ann Arbor (MI): University of Michigan Health System; 2014. 2 p. Electronic copies: Available in PDF from the [UMHS Web site](#) .

Please note: This patient information is intended to provide health professionals with information to share with their patients to help them better understand their health and their diagnosed disorders. By providing access to this patient information, it is not the intention of NGC to provide specific medical advice for particular patients. Rather we urge patients and their representatives to review this material and then to consult with a licensed health professional for evaluation of treatment options suitable for them as well as for diagnosis and answers to their personal medical questions. This patient information has been derived and prepared from a guideline for health care professionals included on NGC by the authors or publishers of that original guideline. The patient information is not reviewed by NGC to establish whether or not it accurately reflects the original guideline's content.

NGC Status

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